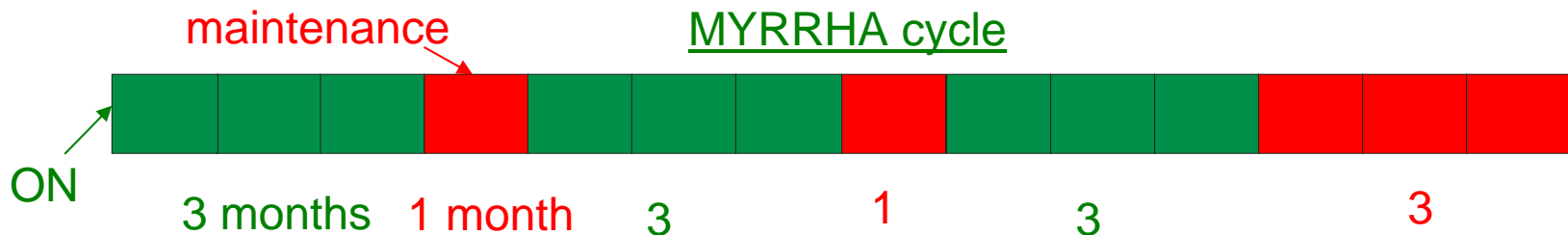
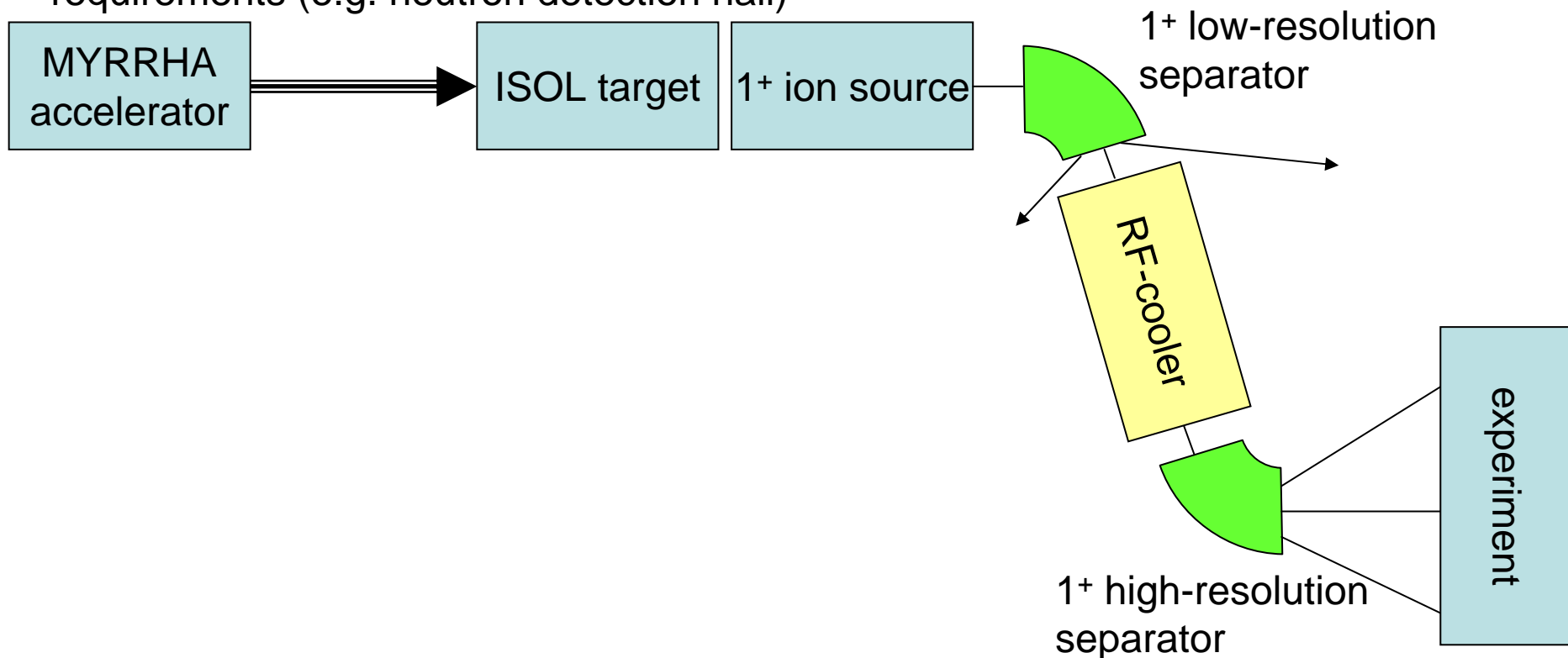


## ISOL@MYRRHA

- 600 MeV, 100-200  $\mu\text{A}$ , D.C. proton beam (from the initial 2.5 mA for MYRRHA): **DC beam needed (how to split off 100 to 200  $\mu\text{A}$ )**
- Different target materials including uranium (e.g. Nb, TiC/C, La, Ta, UC: workhorse targets at present)
- Ruggedized target-ion source systems that deliver RIB @  $\sim 50$  keV:
  - ECR 1+: gaseous elements (noble gases, C, N, O,...)
  - surface ion source (hot cavity): alkaline and earth alkaline elements
  - lasers
- !! degradation of the target performance !!
- Long beam times (e.g. 12 weeks) for experiments that:
  - need very high statistics
  - involve many time consuming systematic measurements
  - hunt for very weak signals
  - have an inherent low-detection efficiency

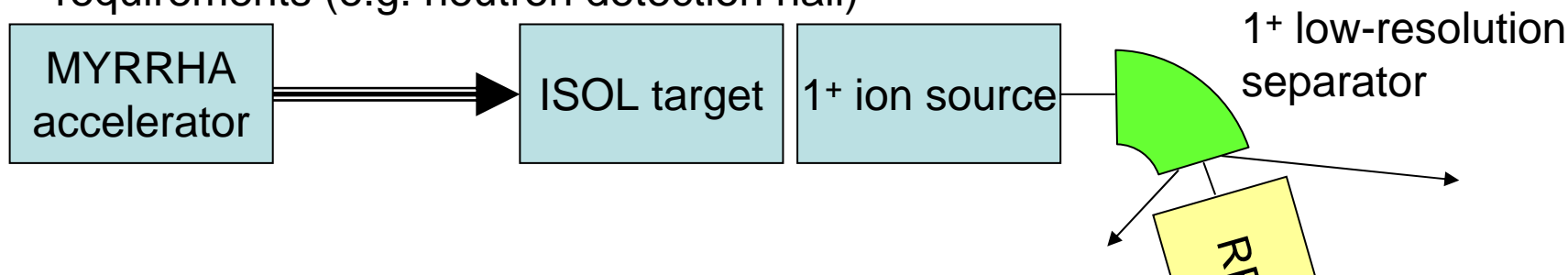


- “Green field” facility at a nuclear site (SCK•CEN):
  - optimal lay-out of the facility: pre-separator – RF-cooler – post-separator (high mass resolution:  $M/\Delta M > 10000$ )
  - multiple – RIB: limited mass range, same element, specific experimental hall requirements (e.g. neutron detection hall)



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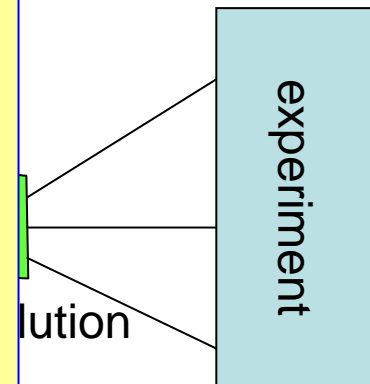
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- ISOL@MYRRHA can deliver:

- pure RIB: selective ionization, chemistry,  $M/\Delta M > 10.000$
- intense RIB x100 compared to the present ISOLDE (of a limited number of isotopes at start-up, leave options open)
- RIB of good ion optical quality
- very long beam times
- optimal experimental conditions/lay-out/support

- ISOL@MYRRHA is based on proven technology



!! effort to make the beams/effort for the experiments !! long-beam times = long idle times

- Complementary to ISOL and In-Flight facilities:
  - HIE-ISOLDE, CERN (Switzerland)
  - SPIRAL2, GANIL (France)
  - TRIUMF (Canada)
  - ORNL (U.S.A.)
  - EURISOL (somewhere in Europe)
  - FAIR, GSI (Germany)
  - RIB factory, RIKEN (Japan)
  - FRIB (U.S.A.)
- Neutron for Science (cfr. SPIRAL2) versus ISOL@MYRRHA
- Possible physics experiments:
  - Many examples given in field of fundamental nuclear physics, fundamental interactions, atomic physics, materials science, nuclear medicine

## Physics case and users

- Is ISOL@MYRRHA justified by the research potential?
- Is the strategy to focus on experiments needing long beam times a good strategy? (long beam times for one experiment inevitably means limited quantitative scientific output (read number of papers)).
- Is the community of (EU)-RIB users large enough to support this number of ISOL-RIB facilities (HIE-ISOLDE, SPIRAL2, EURISOL and ISOL@MYRRHA) in let's say 2020?

## ISOL@MYRRHA in a EU/worldwide RIB context

- Should ISOL@MYRRHA go in competition with ISOLDE, SPIRAL, EURISOL and the other facilities worldwide? e.g. by adding a post-accelerator (5 to 10 MeV/u)
- Should MYRRHA investigate the use of the 2.5 mA proton beam option during two months per 14 months or once the ADS study is done (note that EURISOL demands more than protons)?
- How do we connect with the EU initiatives (e.g. ESFRI)?

## Support for ISOL@MYRRHA

- Will ISOL@MYRRHA be part of the MYRRHA project (? % of global budget), where is the dividing line between ISOL@MYRRHA and the users, what will be the MYRRHA support for this project, will an in-house physicists group be created at SCK•CEN (cfr. ISOLDE or SPIRAL models)?
- Need to acquire the necessary expertise on ISOL systems @ SCK•CEN (training at ISOLDE, ....).
- The Belgian nuclear physics community is small and is further shrinking (cfr. the Louvain-la-Neuve cyclotron center), how can we enlarge this 'local' community (is this necessary)

- If the community thinks ISOL@MYRRHA is a good idea:
  - Workplan – roadmap (close contact between possible users and the MYRRHA team):
    - Approval and initial funding of the MYRRHA project
    - Preliminary report
      - physics cases (summary of the BriX workshop, no duplication of the numerous reports that have been published over the last years): look what will (is planned to be) done by 2020.
      - technical specifications from the users point of view
      - budgetplan/estimate
  - Establishing a users group (including users outside of nuclear physics)
  - Gathering ISOL expertise at SCK•CEN
  - Time line